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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/692,347

10/23/2003

Kyoung-Youm Kim

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08/14/2006

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EXAMINER

DUPUIS, DEREK L

ART UNIT

PAPER NUMBER

2883

DATE MAILED: 08/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/692,347	KIM ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Derek L. Dupuis	2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 5/25/2006.
- 2a) ☒ This action is **FINAL**.      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>6/22/2006</u> .   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments filed 5/25/2006 have been fully considered but they are not persuasive. Applicant argues on page 9 of the remarks that the groove in Seki et al is not disposed at one end surface of the module. Applicant states that "in conclusion, one end of the groove 30B is disposed at end surface 11 and the opposite end of the groove is disposed at the opposite end surface 12." The examiner agrees with this statement. The grooves taught by Seki et al anticipate the claimed invention. The applicant claims that the groove is "disposed at one end surface of the bidirectional optical communication module". As discussed above, a portion of the groove of Seki et al is disposed at one end (11). Another portion of the groove is also disposed at another end (12). The language of the applicant's claim is such that it does not limit the location of the groove to *exclusively* one single end surface.

2. Regarding applicant's comment on page 10 that it is not clear in what sense the office action is using the term "base surface." As used in the claim, the term "base surface" is in reference to the groove, not the module. The claim recites "a reflective layer formed on a base surface *of the groove* ..,". The examiner has interpreted this term based on its use in the claim. In the Seki et al reference, the reflective layer is formed in contact with both side surfaces and the bottom surface of the groove. Therefore, either one of these three surfaces could be a "base surface" since the layer is formed on all three.

3. Applicant argues on pages 10 and 11 that Seki fails to disclose or suggest that the groove is formed by photolithography. As cited in the previous office actions, claims 1-19 are product-by-process claims and thus do not distinguish over the Seki et al reference regardless of the

process used to form the reflective groove, because only the final product is relevant, and not the process of making such as photolithography. Applicant argues that photolithography imparts distinctive structural characteristics such as a final product in conformance with tighter tolerances. The specification explains that conventional dicing methods result in a tolerance of 10 microns while photolithography results in a tolerance of 0.2 microns. The examiner points out that differences between a desired and an actual outcome (groove location) are not structural limitation. It is only the final product structure that is relevant and patentable; not the conformance of a final product to a desired specification. Therefore, the product-by-process claims do not distinguish over the prior art of record.

4. In pages 12 and 13, applicant argues that reference number 20 does not refer to a cladding layer. The examiner agrees. Reference number 20 refers to the substrate. The cladding layer is discussed in column 3, lines 13-26 of Seki.

5. In page 14, the applicant questions the combination of Seki and Kimura. Regarding the confusion over the citation of line numbers, the examiner accidentally made an error in listing the citations. It is column 5, lines 8-35 of Seki that teach that the reflective layer is a dielectric multilayer filter. As explained in the paragraph that follows paragraph 20 of the office action, Kimura is used as a teaching reference to show how metal filter layers are well known in the art.

### ***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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7. Claims 1, 9, 11, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by *Seki et al (US 4,790,615)*.

8. Regarding claim 1, Seki et al teach a bidirectional optical communication module as shown in figure 2. The module includes an input waveguide (25A) for inputting an optical signal and a reflector (40B) having a reflective groove (30B) that is disposed at one end surface (11 or 12) of the module. A reflective layer (40B) is formed on a base surface of the reflective groove (30B) to reflect the optical signal inputted from the input waveguide (25A) to an output waveguide (25B) (see column 3, lines 13-63). At the connection waveguide (23B), light is sent from the input waveguide (25A), to the reflector (40B), and is then outputted to the output waveguide (25B).

9. Regarding claim 9, Seki et al teach a module as discussed above in reference to claim 1. Seki et al teach that the module further comprises a multiplexer (40A), a silicon substrate (10), and a cladding layer stacked on the substrate (20). The waveguides, the multiplexer, and the groove are all formed on the cladding layer (see column 3, lines 13-26).

10. Regarding claim 11, Seki et al teach a bidirectional optical communication module as shown in figure 2. The module includes a multiplexer (23A) connected to a first waveguide (22) for outputting or inputting a multiplexed signal and two second waveguides (24A and 25A) for inputting or outputting a demultiplexed optical signal. The module includes a reflective layer (40B) connected to a terminal of one of the second waveguides (25A) for reflecting an optical signal. A third waveguide (25B) is connected to the reflective layer for inputting or outputting an optical signal reflected by the reflective layer. The reflective layer is formed on a base surface of a reflective groove (30B) that is disposed at one end surface (11 or 12) of the module.

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11. Regarding claim 14, Seki et al teach a module as discussed above in reference to claim
12. Seki et al teach that a connection waveguide (23B) is used to input the optical signal to the reflective layer and to output the optical signal from the reflective layer. The two waveguides connected to the connection waveguides are overlapped at a predetermined angle  $2\theta$  as shown in figure 2.
12. Claims 1-19 are **product-by-process claims**:

Note that a "product by process" claim is directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Thorpe*, 227 USPQ 964, 966; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and *In re Marosi et al.*, 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear. See also MPEP 2113.

13. Claims 1 and 11 do not distinguish over the Seki et al reference regardless of the process used to form the reflective groove, because only the final product is relevant, and not the process of making such as photolithography.

### ***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 2-5, 7, 8, 12, 13, and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Seki et al (US 4,790,615)* as applied to claims 1, 9, 11, and 14 above.
16. Regarding claims 2, 4, 15, and 17, Seki et al teach a module as discussed above in reference to claims 1 and 11. Seki et al define a "filter angle"  $\theta$  as the angle between the optical

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paths and the plane that is normal to the filter as is shown in figure 2. The angle between the two arms would be equal to  $2\theta$ . Seki et al teach in table 3 and in figure 9A and 9B that the angle can be between 0 degrees and 20 degrees. This means that the angle of the arms can be between 0 degrees and 40 degrees.

In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). See MPEP 2144.05.

17. Regarding claims 3, 5, 16, and 18, Seki et al teach a module as discussed above in reference to claims 2, 4, 15, and 17. Seki et al do not teach that the location of the base surface is limited by the range defined by the claimed equations. However, it would have been obvious to one of ordinary skill in the art at the time of invention to limit the location of the base surface by the range defined by the claimed equations since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

18. Regarding claims 7 and 8, Seki et al teach a module as discussed above in reference to claim 1. The input waveguide (25A) is attached to a multiplexer (23A) and the output waveguide (25B) can be connected to a light receiving element. Waveguide 25B can be connected to a light source, and waveguide 25B would then be referenced as an input waveguide and waveguide 25A would then be referenced as an output waveguide (which is connected to a multiplexer (23A)).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the module of Seki et al by coupling the waveguide 25B to a light source or alternatively, to a light detector. Motivation to do this is the suggestion by Seki et al that the waveguides 21, 24A, 24B, and 25B can each be coupled to a light emitting device or a light receiving device (see column 3, lines 47-55). Light sources and light detectors are commonly used examples of these devices that are well known in the art.

19. Regarding claims 12 and 13, Seki et al teach a module as discussed above in reference to claim 11. One of the second waveguides (24A) is attached to light emitting element and the third waveguide (25B) is connected to a light receiving element. Alternatively, waveguide 25B could be connected to a light emitting element, and waveguide 24A could be connected to a light receiving element.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the module of Seki et al by coupling the waveguide 25B to a light source or alternatively, to a light detector and by coupling the waveguide 24A to a light detector or alternatively, to a light source. Motivation to do this is the suggestion by Seki et al that the waveguides 21, 24A, 24B, and 25B can each be coupled to a light emitting device or a light receiving device (see column 3, lines 47-55). Light sources and light detectors are commonly used examples of these devices that are well known in the art.

20. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Seki et al (US 4,790,615)* as applied to claim 1 above and in further view of *Kimura et al (US 2002/0048431 A1)*.



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21. Regarding claim 6, Seki et al teach a module as discussed above in reference to claim 1.

Seki et al teach that the reflective layer is attached on the base of the surface formed by the reflective groove (see column 4, lines 10-25). While Seki et al do not explicitly state that the reflective layer is a metal layer, Seki et al teach that the reflective layer is a dielectric multilayer filter (see column 5, lines 8-35). It is well known in the art that many dielectric filters include silicon, which is classified as semi-metallic. Other well known filters have gold and silver metallic layers to reflect lights of a desired wavelength. Seki et al also suggests that the filter can be made of titanium (see column 7, line 63 to column 8, line 6).

It would have been obvious to one of ordinary skill in the art at the time of invention that the filter of Seki et al could be a metal layer because filters comprising metal layers are well known in the art as has been demonstrated by Kimura et al.

22. Claims 10 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Seki et al (US 4,790,615)* as applied to claims 1, 9, 11, and 14 above, and further in view of *Kitamura (US 6,480,647 B1)*.

23. Regarding claims 10 and 19, Seki et al teach a module as discussed above in reference to claims 1 and 11. Seki et al teach that the optical multiplexer device is a filter. Kitamura teaches several multiplexers used in bidirectional modules, including a directional coupler (figure 4), an MMI coupler (figure 5), and a filter (figure 6).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the module of Seki et al by using a directional coupler or an MMI multiplexer in place of the filter as taught by Kitamura since Kitamura teaches that a directional coupler or an MMI coupler is an art recognized equivalent of a filter for purposes of multiplexing a signal.

*Conclusion*

24. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

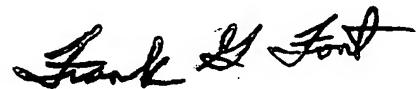
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derek L. Dupuis whose telephone number is (571) 272-3101. The examiner can normally be reached on Monday - Friday 8:30am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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